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NPTEL

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Courses » Introduction to Chemical Thermodynamics and Kinetics

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Unit 13 - Week 11

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Assignment 11

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-04-17, 23:59 IST.**

1) For the first order gas phase decomposition of N_2O_5 , the half life periods at $40^\circ C$ and $60^\circ C$ are respectively 45 min and 6.5 min. Assuming that frequency factor is independent of temperature. Calculate the values of A (Arrhenius factor) and E_a (Activation energy). **1 point**

- $1.5 \times 10^{-12} \text{ min}^{-1}, 2.036 \text{ kcal mol}^{-1}$
- $1.5 \times 10^{12} \text{ min}^{-1}, 2.036 \text{ kcal mol}^{-1}$
- $1.5 \text{ min}^{-1}, 2.036 \text{ kcal mol}^{-1}$
- $1.5 \times 10^{25} \text{ min}^{-1}, 1.036 \text{ kcal mol}^{-1}$

No, the answer is incorrect.**Score: 0****Accepted Answers:** $1.5 \times 10^{12} \text{ min}^{-1}, 2.036 \text{ kcal mol}^{-1}$

2) In question 1, find out the time when the total pressure becomes double the initial pressure at $40^\circ C$. **1 point**

- 71.35 minutes
- 1000 minutes
- 1 minute
- 71.35 seconds

No, the answer is incorrect.**Score: 0****Accepted Answers:** 71.35 minutes

3) For a reaction, the energy of activation (E_a) is 25 kcal mol^{-1} . **1 point**

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No, the answer is incorrect.

Score: 0

Accepted Answers:

1.708

4)

1 point



No, the answer is incorrect.

Score: 0

Accepted Answers:

5) At 27⁰ C, the energy of activation of an uncatalysed reaction is 50 kcal mol⁻¹. By what factor the rate constant of the same reaction is increased when the reaction is catalyzed and the energy of activation is 30 kcal mol⁻¹

3.7 times

1.5 times

2.5 times

7.6 times

1 point



No, the answer is incorrect.

Score: 0

Accepted Answers:

3.7 times

6) Order w.r.t A= 0.5, Order w.r.t B = 1

Order w.r.t A= 0.5, Order w.r.t B = 2

Order w.r.t A= 2, Order w.r.t B = 1

Order w.r.t A= 2, Order w.r.t B = 2

1 point

No, the answer is incorrect.

Score: 0

Accepted Answers:

Order w.r.t A= 0.5, Order w.r.t B = 1

7) In question 6, what would be the order of the reaction with respect to A and B if the first two steps are slow and the second step is fast?

Order w.r.t A= 1, Order w.r.t B =0

Order w.r.t A= 1, Order w.r.t B =2

Order w.r.t A= 2, Order w.r.t B =0

Order w.r.t A= 0, Order w.r.t B =0

1 point

No, the answer is incorrect.

Score: 0

Accepted Answers:

Order w.r.t A= 1, Order w.r.t B =0

8) The enzyme-catalysed conversion of a substrate at 25°C has a Michaelis constant of 0.035 mol dm⁻³. The rate of the reaction is 5.5 ×

$10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1}$ when the substrate concentration is $0.110 \text{ mol dm}^{-3}$. What is the maximum velocity of this enzymolysis?

- $7.26 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1}$
- $7.2 \times 10^{-30} \text{ mol dm}^{-3} \text{ s}^{-1}$
- $72 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1}$
- $7 \times 10^{-20} \text{ mol dm}^{-3} \text{ s}^{-1}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$7.26 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1}$

9) The volume of oxygen gas at 0°C and 101 kPa adsorbed on the surface of 1.00 g of a sample of silica at 0°C was 0.284 cm^3 at 100 Torr and 1.430 cm^3 at 760 Torr . What is the value of V_{mon} ?

- 367.5 cm^3
- 3000 cm^3
- 3.679 cm^3
- 30 cm^3

No, the answer is incorrect.

Score: 0

Accepted Answers:

3.679 cm^3

10) A monolayer of N_2 molecules (effective area 0.55 nm^2) is adsorbed on the surface of 1.00 g of an $\text{Fe}/\text{Al}_2\text{O}_3$ catalyst at 77 K , the boiling point of liquid nitrogen. Upon warming, the nitrogen occupies 2.86 cm^3 at 0°C and 760 Torr . What is the surface area of the catalyst?

- 52.44 m^2
- 42.29 m^2
- 19.22 m^2
- 30.22 m^2

No, the answer is incorrect.

Score: 0

Accepted Answers:

42.29 m^2

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